

CLAIMS

1. A method of producing a bonded wafer comprising bonding a bond wafer made of silicon single crystal and a base wafer via an oxide film or directly and then reducing thickness of the bond wafer, characterized in that the base wafer is a wafer produced by processes comprising slicing a silicon single crystal ingot, and then subjected at least to chamfering, lapping, etching, mirror polishing and cleaning, and the etching process is conducted by subjecting the wafer to alkali etching, and then acid etching, and an etching amount in the alkali etching is larger than an etching amount in the acid etching.

2. The method of producing a bonded wafer according to Claim 1 characterized in that a chamfered part of the base wafer is subjected to a mirror finishing process after the etching process.

3. The method of producing a bonded wafer according to Claim 1 characterized in that a chamfered part of the base wafer is subjected to a mirror finishing process after bonding the bond wafer to the base wafer.

4. The method of producing a bonded wafer according to any one of Claims 1 to 3 characterized in that an etching process is performed by dipping the wafer in an aqueous solution of hydrogen peroxide after conducting

alkali etching, and then conducting acid etching.

5. The method of producing a bonded wafer according to any one of Claims 1 to 4 characterized in that the etching amount is 10 to 30 μm in the alkali etching and 5 to 20 μm in the acid etching.

6. The method of producing a bonded wafer according to any one of Claims 1 to 5 characterized in that the alkali etching solution is an aqueous solution of NaOH or an aqueous solution of KOH, and the acid etching solution is an aqueous solution of mixed acids comprising hydrofluoric acid, nitric acid, acetic acid and water.

7. The method of producing a bonded wafer according to any one of Claims 1 to 6 characterized in that the acid etching is reaction-controlled acid etching.

8. The method of producing a bonded wafer according to Claim 7 characterized in that the solution for reaction-controlled acid etching is an aqueous solution of mixed acids comprising hydrofluoric acid, nitric acid, acetic acid and water in which silicon is dissolved at concentration of 20 to 30 g/l.

9. A method of producing a bonded wafer comprising bonding a bond wafer made of silicon single crystal and a

base wafer via an oxide film or directly, and then reducing thickness of the bond wafer, characterized in that the base wafer is a wafer produced by processes comprising slicing a silicon single crystal ingot, and then subjected at least to chamfering, lapping, etching, mirror polishing and cleaning, and the etching process is conducted by subjecting the wafer to acid etching, and the mirror polishing process is conducted on both surfaces.

10. The method of producing a bonded wafer according to Claim 9 characterized in that a chamfered part of the base wafer is subjected to a mirror finishing process after the above-mentioned etching process.

11. The method of producing a bonded wafer according to Claim 9 characterized in that a chamfered part of the base wafer is subjected to a mirror finishing process after bonding a bond wafer to a base wafer.

12. A bonded wafer produced by a method according to any one of Claims 1 to 11.

13. A bonded wafer having a base wafer wherein back surface is chemically etched, a chamfered part is mirror surface, and the chemically etched back surface is subjected to acid etching following to alkali etching.

14. A bonded wafer wherein a back surface of its base wafer is chemically etched and a chamfered part is mirror surface, and on the chemically etched back surface, the maximal depth of the pit is $6\text{ }\mu\text{m}$ or less and the average value of waviness is $0.04\text{ }\mu\text{m}$ or less.

15. A bonded wafer wherein waviness having a wavelength of 10 mm is 0.5 to $10\text{ }\mu\text{m}^3$ as power spectrum density.

16. A bonded wafer wherein at least a back surface and a chamfered part of the base wafer are mirror surface.

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